

**CPC****COOPERATIVE PATENT CLASSIFICATION****G01T**

**MEASUREMENT OF NUCLEAR OR X-RADIATION** ( radiation analysis of materials, mass spectrometry [G01N](#) ; counters per se [G06M](#) , [H03K](#) ; electric discharge tubes for analysing radiation or particles [H01J 40/00](#) , [H01J 47/00](#) , [H01J 49/00](#) )

**NOTE**

This subclass covers the measurement of X-radiation, gamma radiation, corpuscular radiation, cosmic radiation or neutron radiation.

Attention is drawn to the Notes following the title of class [G01](#) .

**G01T 1/00**

**Measuring X-radiation, gamma radiation, corpuscular radiation, or cosmic radiation** ( [G01T 3/00](#) , [G01T 5/00](#) take precedence )

## G01T 1/003

. { Scintillation (flow) cells }

## G01T 1/006

. { Total absorption calorimeters; Shower detectors }

## G01T 1/02

. Dosimeters ( [G01T 1/15](#) takes precedence, measuring exposure time to X-rays [H05G 1/28](#) )

## G01T 1/023

.. { Scintillation dose-rate meters }

## G01T 1/026

.. { Semiconductor dose-rate meters }

## G01T 1/04

.. Chemical dosimeters ( [G01T 1/06](#) , [G01T 1/08](#) take precedence )

## G01T 1/06

.. Glass dosimeters { using colour change; including plastic dosimeters }

## G01T 1/08

.. Photographic dosimeters ( sensitive materials, processing thereof [G03C](#) ; { photometry [G01J 1/52](#) } )

## G01T 1/10

.. Luminescent dosimeters

## G01T 1/105

... Read-out devices ( [G01T 1/115](#) takes precedence )

## G01T 1/11

... Thermo-luminescent dosimeters { ( thermo-luminescent compositions [C09K 11/00](#) ) }

## G01T 1/115

.... Read-out devices

## G01T 1/12

.. Calorimetric dosimeters

## G01T 1/14

.. Electrostatic dosimeters ( construction of ionisation chambers [H01J 47/02](#) ; { electrometers [G01R 5/28](#) } )

## G01T 1/142

... Charging devices ; Read-out devices

## G01T 1/15

. Instruments in which pulses generated by a radiation detector are integrated, e.g. by a diode pump circuit ( pulse rate meters in general [G01R 23/02](#) )

## G01T 1/16

. Measuring radiation intensity ( [G01T 1/29](#) takes precedence; { self-powered detectors [G01T 3/006](#) ; using an ionisation chamber filled with a liquid or solid, e.g. frozen liquid, dielectric [G01T 3/008](#) } )

## G01T 1/1603

.. { with a combination of at least two different types of detector ( see provisionally also [G01T 1/16](#) ) }

- G01T 1/1606 .. { with other specified detectors not provided for in the other sub-groups of [G01T 1/16](#) ( see provisionally also [G01T 1/16](#) ) }
- G01T 1/161 .. Application in the field of nuclear medicine, e.g. in vivo counting { ( apparatus for radiation diagnosis [A61B 6/00](#) ) }
- G01T 1/1611 ... { using both transmission and emission sources sequentially ( SPECT imaging [G01T 1/1642](#) ; PET imaging [G01T 1/2985](#) ; detecting hidden objects, e.g. weapons, explosives [G01V 5/00 D](#) ) }
- G01T 1/1612 .... { with scintillation detectors ( [G01T 1/20](#) takes precedence ) }
- G01T 1/1614 .... { with semiconductor detectors ( [G01T 1/24](#) takes precedence ) }
- G01T 1/1615 ... { using both transmission and emission sources simultaneously ( SPECT imaging [G01T 1/1642](#) ; PET imaging [G01T 1/2985](#) ; detecting hidden objects, e.g. weapons, explosives [G01V 5/00 D](#) ) }
- G01T 1/1617 .... { with scintillation detectors ( [G01T 1/20](#) takes precedence ) }
- G01T 1/1618 .... { with semiconductor detectors ( [G01T 1/24](#) takes precedence ) }
- G01T 1/163 ... Whole body counters { hand or feet contamination measurement [G01T 1/167](#) ; lung, brain, thyroid, kidney or the like counting [G01T 1/16](#) }
- G01T 1/1635 .... { involving relative movement between detector and subject; scanning beds ( profile scanning [G01T 1/166](#) ; positioning patients, tiltable tables for radiation diagnosis [A61B 6/04](#) ) }
- G01T 1/164 ... Scintigraphy ( radioisotopes [G21G 4/00](#) ; tracers [G21H 5/00](#) ; { measurement of spatial distribution [G01T 1/2914](#) ; apparatus for radiation diagnosis in different planes [A61B 6/02](#) } )
- G01T 1/1641 .... { Static instruments for imaging the distribution of radioactivity in one or two dimensions using one or several scintillating elements; Radio-isotope cameras }
- G01T 1/1642 ..... { using a scintillation crystal and position sensing photodetector arrays, e.g. ANGER cameras }
- G01T 1/1644 ..... { using an array of optically separate scintillation elements permitting direct location of scintillations ( [G01T 1/1645](#) takes precedence ) }
- G01T 1/1645 ..... { using electron optical imaging means, e.g. image intensifier tubes, coordinate photomultiplier tubes, image converter }
- G01T 1/1647 ..... { Processing of scintigraphic data ( not related to a particular imaging system [G01T 1/2992](#) ; special purpose computers for nuclear physics [G06F 15/52](#) ) }
- G01T 1/1648 ..... { Ancillary equipment for scintillation cameras e.g. reference markers, devices for removing motion artifacts, calibration devices ( adapted for flow studies [G01T 1/1647](#) ) }
- G01T 1/166 .... involving relative movement between detector and subject ( { scanners in general without using scintigraphy [G01T 1/2964](#) } )
- G01T 1/1663 ..... { Processing methods of scan data, e.g. involving contrast enhancement, background reduction, smoothing, motion correction, dual radio-isotope scanning, computer processing ( for measuring spatial distribution of radiation [G01T 1/2992](#) ; digital computing or data processing equipment or methods specially adapted for nuclear physics or nuclear engineering [G06F 15/52](#) , e.g. for image data processing [G06F 15/52D](#) ; general purpose image data processing [G06T 1/00](#) ; computerized tomography [G06T 11/003](#) ) ; Ancillary equipment ( colour printers [G01T 1/1666](#) ) }
- G01T 1/1666 ..... { adapted for printing different symbols or colours according to the intensity or energy level of the detected radioactivity ( depth discrimination in colour [G01T 1/2985](#) ) }
- G01T 1/167 .. Measuring radioactive content of objects, e.g. contamination ( whole body counters [G01T 1/163](#) )

- G01T 1/169 .. Exploration, location of contaminated surface areas ( [prospecting by the use of nuclear radiation e.g. of natural or induced radioactivity G01V 5/00](#) ) { [in situ measurement, e.g. floor contamination monitor \( directional detectors G01T 1/2907 \)](#) }
- G01T 1/17 .. Circuit arrangements not adapted to a particular type of detector { ( [pulse-selection circuits H03K](#) , [G01R](#) ) }
- G01T 1/171 ... { [Compensation of dead-time counting losses \( see provisionally also 1/17 \)](#) }
- G01T 1/172 ... with coincidence circuit arrangements ( [G01T 1/178 takes precedence; { combination of detectors, see G01T 1/1603 , G01T 1/30 , G01T 1/361 , G01T 1/36D2 , G01T 1/36D3 }](#) ) }
- G01T 1/175 ... Power supply circuits ( [power supply circuits per se H02J](#) ; [converters H02M](#) ) }
- G01T 1/178 ... for measuring specific activity in the presence of other radioactive substances, e.g. natural, in the air or in liquids such as rain water
- G01T 1/18 .. with counting-tube arrangements, e.g. with Geiger counters ( [tubes H01J 47/08](#) ; { [with alarm provision G01T 7/125](#) } ) }
- G01T 1/185 .. with ionisation chamber arrangements ( [construction of ionisation chambers H01J 47/02](#) ; { [gas analysis by ionisation G01N 27/66](#) ; [measuring pressure G01L 9/00](#) ; [leak detection G01M 3/00](#) ; [tele-measurements G08C](#) } ) }
- G01T 1/20 .. with scintillation detectors
- G01T 1/2002 ... { [Optical details, e.g. reflecting or diffusing layers](#) }
- G01T 1/2004 ... { [Scintilloscopes \( fluoroscopes G21K 4/00 ; radiation diagnosis A61B 6/00 \)](#) }
- G01T 1/2006 ... { [using a combination of a scintillator and photodetector which measures the means radiation intensity](#) }
- G01T 1/2008 ... { [using a combination of different types of scintillation detectors, e.g. phoswich](#) }

**WARNING**

Pending reclassification, for subject-matter regarding phoswich see also [G01T 1/20](#)

- G01T 1/201 ... { [using scintillating fibres](#) }

**WARNING**

Not complete, see also [G01T 1/2992](#)

- G01T 1/2012 ... { [using stimuable phosphors, e.g. stimuable phosphor sheets](#) }

**WARNING**

This group and subgroups are not complete pending reclassification; see also group [G01T 1/2992](#)

- G01T 1/2014 .... { [Reading out of stimuable sheets, e.g. latent image](#) }
- G01T 1/2016 .... { [Erasing of stimuable sheets, e.g. with light, heat or the like](#) }
- G01T 1/2018 ... { [Scintillation-photodiode combination](#) }
- G01T 1/202 ... the detector being a crystal
- G01T 1/2023 .... { [Selection of materials \( see provisionally also G01T 1/202 \)](#) }
- G01T 1/2026 .... { [Well-type detectors \( see provisionally also G01T 1/202 \)](#) }
- G01T 1/203 ... the detector being made of plastics

G01T 1/2033	....	{ Selection of materials ( see provisionally also <a href="#">G01T 1/203</a> ) }
G01T 1/2036	....	{ Well-type detectors ( see provisionally also <a href="#">G01T 1/203</a> ) }
G01T 1/204	...	the detector being a liquid
G01T 1/2042	....	{ Composition for liquid scintillation systems }
G01T 1/2045	.....	{ Liquid scintillation quench systems }
G01T 1/2047	.....	{ Sample preparation }
G01T 1/205	...	the detector being a gas
G01T 1/208	...	Circuits specially adapted for scintillation detectors, e.g. for the photo-multiplier section
G01T 1/22	..	with Cerenkov detectors
G01T 1/24	..	with semiconductor detectors ( semiconductor devices per se <a href="#">H01L 31/00</a> )
G01T 1/241	...	{ Electrode arrangements, e.g. continuous or parallel strips or the like ( constructional or manufacturing details <a href="#">H01L 31/00</a> ) }
G01T 1/242	...	{ Stacked detectors, e.g. for depth information } ( constructional or manufacturing details <a href="#">H01L 25/00</a> ) ]
G01T 1/243	...	{ Modular detectors, e.g. arrays formed from self contained units ( constructional or manufacturing details <a href="#">H01L 25/00</a> ) }
G01T 1/244	...	{ Auxiliary details, e.g. casings, cooling, damping or insulation against damage by e.g. heat, pressure or the like }
G01T 1/245	...	{ using memory cells }
G01T 1/246	...	{ utilizing latent read-out, e.g. charge stored and read-out later }
G01T 1/247	...	{ Detector read-out circuitry ( for processing gain or off-set correction <a href="#">H04N</a> ) }
G01T 1/248	...	{ Silicon photomultipliers [SiPM], e.g. an avalanche photodiode [APD] array on a common Si substrate }
G01T 1/249	...	{ specially adapted for use in SPECT or PET ( SPECT imaging <a href="#">G01T 1/1642</a> ; PET imaging <a href="#">G01T 1/2985</a> ; detecting hidden objects, e.g. weapons, explosives <a href="#">G01V 5/00 D</a> ) }
G01T 1/26	..	with resistance detectors { ( photoresistors <a href="#">H01L 31/00</a> ) }
G01T 1/28	..	with secondary-emission detectors ( secondary-electron-emitting electrodes in general <a href="#">H01J 1/32</a> ) { optionally combined with scintillation counters ( secondary emission tubes <a href="#">H01J 43/00</a> ) }
G01T 1/29	.	Measurement performed on radiation beams, e.g. position or section of the beam ; Measurement of spatial distribution of radiation ( scintigraphy <a href="#">G01T 1/164</a> ; mass-spectrometers <a href="#">H01J 49/025</a> )
G01T 1/2907	..	{ Angle determination; Directional detectors; Telescopes ( prospecting by the use of nuclear radiation, e.g. of natural or induced radioactivity <a href="#">G01V 5/00</a> ) }
G01T 1/2914	..	{ Measurement of spatial distribution of radiation }
G01T 1/2921	...	{ Static instruments for imaging the distribution of radioactivity in one or two dimensions; Radio-isotope cameras ( using scintigraphy <a href="#">G01T 1/1641</a> ) }
G01T 1/2928	....	{ using solid state detectors }
G01T 1/2935	....	{ using ionisation detectors }
G01T 1/2942	....	{ using autoradiographic methods }
G01T 1/295	....	{ using coded aperture devices e.g. Fresnel zone plates ( handling of radiation of particles e.g. using diaphragms, collimators, diffraction <a href="#">G21K 1/00</a> ) }

- G01T 1/2957 . . . . { using channel multiplier arrays ( channel multipliers [H01J 43/18](#) ; [G01T 1/1645](#) takes precedence ) }
- G01T 1/2964 . . . { Scanners ( using scintigraphy [G01T 1/166](#) ) }
- G01T 1/2971 . . . . { using solid state detectors }
- G01T 1/2978 . . . { Hybrid imaging systems, e.g. using a position sensitive detector (camera) to determine the distribution in one direction and using mechanical movement of the detector or the subject in the other direction or using a camera to determine the distribution in two dimensions and using movement of the camera or the subject to increase the field of view ( [G01T 1/2985](#) takes precedence ) }
- G01T 1/2985 . . . { In depth localisation e.g. using positron emitters; Tomographic imaging ( longitudinal and transverse section imaging; apparatus for radiation diagnosis sequentially in different planes, stereoscopic radiation diagnosis ) ; ( using external radiation sources [A61B 6/02](#) ) }
- G01T 1/2992 . . . { Radioisotope data or image processing not related to a particular imaging system; Off-line processing of pictures, e.g. rescanners ( for measuring radiation intensity [G01T 1/1663](#) ; digital computing or data processing equipment or methods specially adapted for nuclear physics or nuclear engineering [G06F 15/52](#) , e.g. for image data processing [G06F 15/52D](#) ; general purpose image data processing [G06T 1/00](#) ; computerized tomography [G06T 11/003](#) ) }
- G01T 1/30 . Measuring half-life of a radioactive substance { ( period meters for nuclear fission reactors [G21C 17/14](#) ) }
- G01T 1/32 . Measuring polarisation of particles
- G01T 1/34 . Measuring cross-section, e.g. absorption cross-section of particles
- G01T 1/36 . Measuring spectral distribution of X-rays or of nuclear radiation { spectrometry ( pulse selection circuits per se [H03K](#) ; investigation of materials by radiation diffraction [G01N 23/20](#) ; spectrometer tubes [H01J 49/00](#) ) }
- G01T 1/361 . . { with a combination of detectors of different types, e.g. anti-Compton spectrometers ( intensity measurement with a combination of detectors [G01T 1/1603](#) ; with coincidence circuit [G01T 1/172](#) ; see provisionally also [G01T 1/36](#) ) }

**NOTE**

[G01T 1/361](#) takes precedence over [G01T 1/362](#)

- G01T 1/362 . . { with scintillation detectors ( see provisionally also [G01T 1/36](#) , [G01T 1/20](#) ) }
- G01T 1/363 . . { with Cerenkov detectors }
- G01T 1/365 . . { with ionisation detectors e.g. proportional counter ( see provisionally also [G01T 1/36](#) ) }
- G01T 1/366 . . { with semi-conductor detectors ( see provisionally also [G01T 1/36](#) ) }
- G01T 1/367 . . { with resistance detectors ( see provisionally also [G01T 1/36](#) ) }
- G01T 1/368 . . { with secondary-emission detectors ( see provisionally [G01T 1/36](#) ) }
- G01T 1/38 . . Particle discrimination and measurement of relative mass, e.g. by measurement of loss of energy with distance (dE/dx) { ( constructional details of semiconductor detectors therefor [H01L 31/00](#) ) }
- G01T 1/40 . . Stabilisation of spectrometers { ( circuits specially adapted for scintillation detectors [G01T 1/208](#) ) }

- G01T 3/00**      **Measuring neutron radiation** ( [G01T 5/00](#) takes precedence; { tubes therefor [H01J 47/12](#) ; circuits with such tubes [G01T 1/18](#) ; measuring short time intervals [G04F 10/00](#) ; measuring pulse characteristics [G01R 29/02](#) ; neutron choppers [G21K 1/04](#) ; polarimeters [G01T 1/32](#) } )
- G01T 3/001      . { **Spectrometry** ( see provisionally also [G01T 1/36](#) to [G01T 1/368](#) -except [G01T 1/36D3](#) - , [G01T 3/00](#) ; other sub-groups of [G01T 3/00](#) take precedence ) }
- G01T 3/003      .. { **Recoil spectrometers** ( light-nuclei recoil ionisation tubes per se [H01J 47/1277](#) ) }
- G01T 3/005      .. { **Time-of-flight spectrometers** ( see provisionally also [G01T 3/00](#) ) }
- G01T 3/006      . { using self-powered detectors ( for neutrons as well as for  $\gamma$ - or X-rays ) , e.g. using Compton-effect ( **Compton diodes** ) or photo-emission or a (n,B) nuclear reaction ( photovoltaic semiconductors [H01L 31/00](#) ; photo-tubes [H01J 40/00](#) ; thermionic generators [H01J 45/00](#) ; radioisotopic generators [G21H 1/00](#) , e.g. [G21H 1/02](#), [G21H 1/04](#) ) }
- G01T 3/008      . { using an ionisation chamber filled with a gas, liquid or solid, e.g. frozen liquid, dielectric ( [G01T 3/006](#) takes precedence ) }
- G01T 3/02      . by shielding other radiation
- G01T 3/04      . using calorimetric devices
- G01T 3/06      . with scintillation detectors
- G01T 3/065      .. { **Spectrometry** }
- G01T 3/08      . with semiconductor detectors ( semiconductor detectors per se [H01L 31/00](#) )
- G01T 3/085      .. { **Spectrometry** }
- G01T 5/00**      **Recording of movements or tracks of particles** ( spark chambers [H01J 47/00](#) ) ; **Processing or analysis of such tracks**
- G01T 5/002      . { using a combination of several movement of track recording devices ( detectors associated with recording chambers and only serving to trigger these chambers, see the appropriate groups of the chamber e.g. [G01T 5/04](#) - [G01T 5/08](#) ; see provisionally also [G01T 5/00](#) and other sub-groups ) }
- G01T 5/004      . { **Non-electrical readout of multi-wire or parallel-plate chambers** ( non-electrical readout in such chambers per se [H01J 47/22](#) ) }
- G01T 5/006      .. { by optical methods }
- G01T 5/008      .. { by acoustical methods }
- G01T 5/02      . Processing of tracks ; Analysis of tracks { ( special purpose computers for nuclear physics [G06F 15/52](#) ) }
- G01T 5/04      . Cloud chambers, e.g. Wilson chamber
- G01T 5/06      . Bubble chambers
- G01T 5/08      . Scintillation chambers ( discharge tubes [H01J 40/00](#) , [H01J 47/00](#) ; semiconductor

devices [H01L](#) )

- G01T 5/10 . Plates or blocks in which tracks or nuclear particles are made visible by after-treatment, e.g. using photographic emulsion, using mica
- G01T 5/12 . Circuit arrangements with multi-wire or parallel-plate chambers, e.g. spark chambers ( tubes per se [H01J 47/00](#) )
- G01T 5/122 . . { for readout of each individual wires; ( readout in such chambers per se [H01J 47/16](#) ) ; for processing the output signals }
- G01T 5/125 . . . { by using delay lines }
- G01T 5/127 . . . . { by using magnetostrictive delay lines }

## G01T 7/00

### Details of radiation-measuring instruments

- G01T 7/005 . { calibration techniques ( stabilization of spectrometer [G01T 1/40](#) ) }
- G01T 7/02 . Collecting means for receiving or storing samples to be investigated { and possibly directly transporting the samples to the measuring arrangement; particularly for investigating radioactive fluids ( sampling, preparing specimens for investigation in general [G01N 1/00](#) , [G01N 1/02](#) ; shielded cells or rooms structurally combined with manipulative devices [G21F](#) ; measuring of chromatographically separated samples [G01N 30/00](#) to [G01N 30/96](#) ) }
- G01T 7/04 . . by filtration
- G01T 7/06 . . by electrostatic precipitation ( [G01T 7/04](#) takes precedence )
- G01T 7/08 . Means for conveying samples received { ( i.e. sample changers [G01N 35/00](#) ) }
- G01T 7/10 . . using turntables
- G01T 7/12 . Provision for actuation of an alarm
- G01T 7/125 . . { Alarm- or controlling circuits using ionisation chambers, proportional counters or Geiger-Mueller tubes, also functioning as UV detectors ( measuring radiation intensity with counting tubes [G01T 1/18](#) ; measuring radiation intensity with ionisation chambers [G01T 1/185](#) ; fire alarms actuated by presence of radiation of particles, e.g. of infra-red radiation, of ions [G08B 7/12](#) ; flame monitoring in combustion devices [F23Q 7/00](#) , [F23N](#) ; discharge tubes per se [H01J 47/00](#) ) }